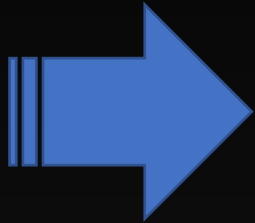


Space Technology Mission Directorate

The 2022 NASA Strategic plan outlines the goals and objectives NASA will pursue to fulfill its mission (see Table 2). STMD has primary lead responsibility implementing Strategic Goal 3, Objective 3.1. Additionally, STMD contributes to achieving all NASA strategic goals and objectives through developing crosscutting technologies for multiple customers. The STMD Technology Portfolio is the vehicle by which Strategic Objective 3.1 is implemented.

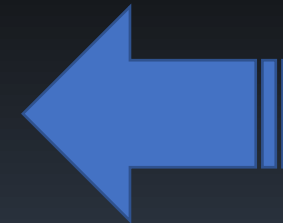


Strategic Objective 3.1 Innovate and advance transformational space technologies.

Develop revolutionary, high-payoff space technologies driven by diverse ideas to transform NASA missions and ensure American leadership in the space economy.

In addition, the 2020 National Space Policy provides the direction for NASA to lead in:

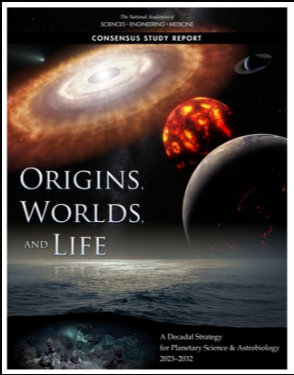
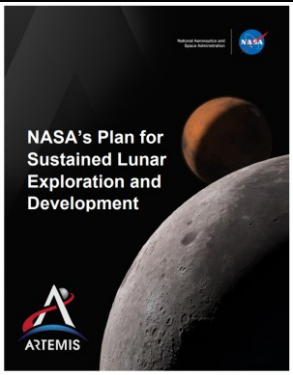
"the responsible and constructive use of space, promoting a robust commercial space industry, returning Americans to the Moon and preparing for Mars, leading in exploration, and defending United States and allied interests in space."



The policy emphasizes the importance of facilitating the growth of the commercial space sector, continuing the sustained US leadership in space. As NASA's technology mission directorate dedicated to developing state-of-the-art and advanced cross-cutting technologies, STMD develops technologies that enable science and human exploration goals and support the space economy, working with industry and academia ensuring a robust national space technology engine to meet national needs.

Strategic Technology Architecture Roundtable (STAR) Process

In order to achieve the NASA Strategic Objective led by the Space Technology Mission Directorate, the STAR process was implemented to bring together the various inputs from stakeholders to produce a set of gaps that can be closed through STMD investments.



Draws directly on Artemis architectures and Science Mission Directorate Decadal to identify technology gaps.

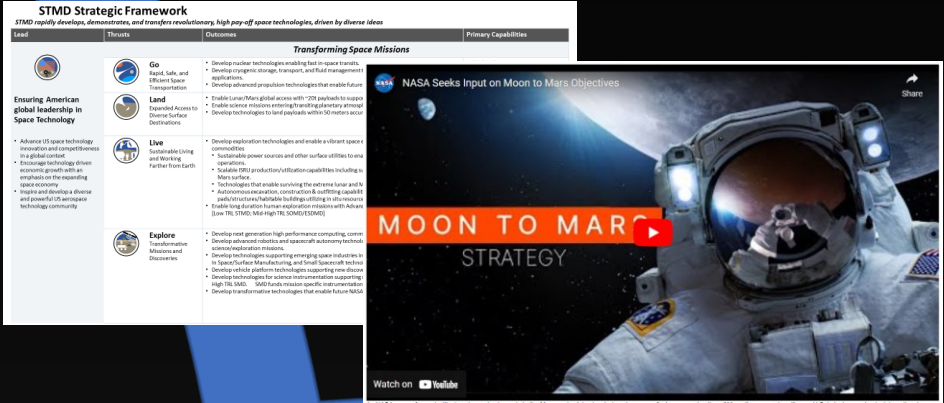
Space Community' participation is obtained through Conferences and Requests for Information (RFIs) to validate envisioned futures, the current state of the art and the gaps between those two.



STAR process inclusive of Center Chief Technologists, ESDMD and SMD Representation.

Maps to OTPS Taxonomy.

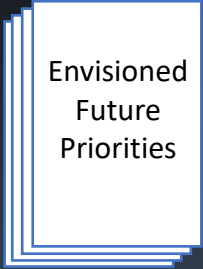
STMD Strategic Framework describes the STMD investment priority strategy. Strategic Technology Framework aligned to Agency Moon to Mars Strategy along with science and industry partner needs, prioritized by Agency Strategic Capability Leads (SCLs) and Principal Technologists (PTs).



STAR



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PPBE Process

STARPort is the database of all Capability Area gaps for both STMD and ESDMD. Envisioned Future Priorities (EFPs) are written by SCL/PTs to show the future state envisioned and suggested path forward to inform Planning, Programming, Budgeting, and Execution (PPBE) process.

STMD Strategic Framework

STMD rapidly develops, demonstrates, and transfers revolutionary, high pay-off space technologies, driven by diverse ideas

Lead	Thrusts	Outcomes	Primary Capabilities
 <p>Ensuring American global leadership in Space Technology</p> <ul style="list-style-type: none"> • Advance US space technology innovation and competitiveness in a global context • Encourage technology driven economic growth with an emphasis on the expanding space economy • Inspire and develop a diverse and powerful US aerospace technology community 	Transforming Space Missions		
	 <p>Go Rapid, Safe, and Efficient Space Transportation</p>	<ul style="list-style-type: none"> • Develop nuclear technologies enabling fast in-space transits. • Develop cryogenic storage, transport, and fluid management technologies for surface and in-space applications. • Develop advanced propulsion technologies that enable future science/exploration missions. 	<ul style="list-style-type: none"> • Nuclear Systems • Cryogenic Fluid Management • Advanced Propulsion
	 <p>Land Expanded Access to Diverse Surface Destinations</p>	<ul style="list-style-type: none"> • Enable Lunar/Mars global access with ~20t payloads to support human missions. • Enable science missions entering/transiting planetary atmospheres and landing on planetary bodies. • Develop technologies to land payloads within 50 meters accuracy and avoid landing hazards. 	<ul style="list-style-type: none"> • Entry, Descent, Landing, & Precision Landing
	 <p>Live Sustainable Living and Working Farther from Earth</p>	<ul style="list-style-type: none"> • Develop exploration technologies and enable a vibrant space economy with supporting utilities and commodities <ul style="list-style-type: none"> • Sustainable power sources and other surface utilities to enable continuous lunar and Mars surface operations. • Scalable ISRU production/utilization capabilities including sustainable commodities on the lunar & Mars surface. • Technologies that enable surviving the extreme lunar and Mars environments. • Autonomous excavation, construction & outfitting capabilities targeting landing pads/structures/habitable buildings utilizing in situ resources. • Enable long duration human exploration missions with Advanced Habitation System technologies. [Low TRL STMD; Mid-High TRL SOMD/ESDMD] 	<ul style="list-style-type: none"> • Advanced Power • In-Situ Resource Utilization • Advanced Thermal • Advanced Materials, Structures, & Construction • Advanced Habitation Systems
	 <p>Explore Transformative Missions and Discoveries</p>	<ul style="list-style-type: none"> • Develop next generation high performance computing, communications, and navigation. • Develop advanced robotics and spacecraft autonomy technologies to enable and augment science/exploration missions. • Develop technologies supporting emerging space industries including: Satellite Servicing & Assembly, In Space/Surface Manufacturing, and Small Spacecraft technologies. • Develop vehicle platform technologies supporting new discoveries. • Develop technologies for science instrumentation supporting new discoveries. [Low TRL STMD/Mid-High TRL SMD. SMD funds mission specific instrumentation (TRL 1-9)] • Develop transformative technologies that enable future NASA or commercial missions and discoveries 	<ul style="list-style-type: none"> • Advanced Avionics Systems • Advanced Communications & Navigation • Advanced Robotics • Autonomous Systems • Satellite Servicing & Assembly • Advanced Manufacturing • Small Spacecraft • Rendezvous, Proximity Operations & Capture • Sensor & Instrumentation

STMD Strategic Framework Definitions



STARPort database stores the technology gaps associated with a strategic capability and links them to the Thrusts and Strategic Outcomes. STARPort is part of the TechPort ecosystem and therefore has access to STMD and other Agency technology program data. This database provides the capability to trace investments from the highest levels of strategy, down through the capability areas and gaps, all the way to the individual projects and track progress over time. NASA is developing both public and government only facing STARPort common database.